

EDITORIAL

Risk Models in Abdominal Aortic Aneurysm Surgery; Useful for Policy Makers or Patients?

In the current issue of the *Journal* several risk scores of Hadjianastassiou and Tang are presented that might be used for outcome studies, guide administrators in purchasing critical care, and auditing purposes. Though the studied models seem to be useful for auditing purposes, it should be realized that these models are partially based on intraoperative data. Therefore these models are of limited use for the preoperative assessment of postoperative outcome.

Recently the Customized Probability Index has been developed by Kertai *et al.*¹ It is a so-called Bayesian model for the prediction of all-cause perioperative mortality in the patients undergoing all types of open vascular surgery. Risk factors associated with postoperative all-cause death were ischemic heart disease, congestive heart failure, cerebrovascular events, hypertension, renal dysfunction, chronic pulmonary disease, and type of vascular surgery, i.e. elective AAA, lower extremity, and carotid. The final logistic regression model included 9 independent predictors (including beta-blocker and statin use) of perioperative mortality. The type of surgery was a strong risk factor; patients with elective AAA surgery had the worse outcome (26 points), followed by lower extremity arterial bypass surgery (15 points), and carotid surgery (0 points). It should be noted that all procedures in the risk model were open surgical procedures. Risk factors based on medical history, ordered in descending risk, were: renal dysfunction (16 points), congestive heart failure (14 points), ischemic heart disease (13 points), cerebrovascular event (10 points), hypertension (7 points), and pulmonary disease (7 points). Based on the sum of scores of surgical risk (0–46 points), medical history (0–67 points), and the score for cardioprotective medication (statins –10 points and beta-blockers –15 points) a risk for perioperative mortality can be calculated.

Importantly, not only postoperative mortality but also morbidity should be taken into account in preoperative risk stratification as patients with a nonfatal cardiac event have a 2-fold increased risk of mortality within 1 year after surgery. Recently, a risk score using

data of a large study population, DECREASE I trial,² was developed. Seven independent clinical risk factors for the composite of postoperative cardiac death and nonfatal myocardial infarction: were identified a history of myocardial infarction, angina pectoris, congestive heart failure, diabetes mellitus, renal dysfunction, cerebrovascular events, and age > 70 years. The risk of perioperative cardiac events increased by each risk factor added, ranging from 1% in patients without risk factors, to 2%, 5%, 9%, 18%, and 32% for 1, 2, 3, 4, and >5 risk factors respectively. Other preoperative risk scores like the Glasgow Aneurysm Score,³ the Leiden Risk model⁴ and the model developed by L'Italien *et al.*⁵ have a comparable value.

As expected, the addition of intraoperative data that are directly correlated to myocardial stress, close to the predicted composite event, results in a superior accuracy. The average AUC of these risk models was superior compared to the risk score strictly using preoperative data (AUC approximately 0.76 vs 0.88 respectively).

Risk models that incorporate intraoperative or postoperative data to predict postoperative outcome are useful for auditing, policy making and research. However for daily patient care risk prediction models that rely solely on preoperative clinical risk factors are preferred.

References

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